

WHAT IS CLAIMED IS:

1 1. A stamping tool comprising:
2 a stamp capable of imprinting at least one deposit of
3 deformable material on an integrated circuit substrate;
4 wherein said stamping tool is capable of aligning a
5 position of said stamp with respect to at least one tooling
6 hole in said integrated circuit substrate.

1 2. The stamping tool as set forth in Claim 1 wherein
2 said stamping tool is capable of aligning a position of
3 said stamp with respect to at least one tooling hole in
4 said integrated circuit substrate to within a tolerance of
5 less than one hundred microns.

1 3. The stamping tool as set forth in Claim 1
2 comprising:

3 a first stamping tool column having a lower end
4 capable of fitting within a first tooling hole in said
5 integrated circuit substrate;

6 a second stamping tool column having a lower end
7 capable of fitting within a second tooling hole in said
8 integrated circuit substrate;

9 a stamping tool cross member attached to an upper end
10 of said first stamping tool column and attached to an upper
11 end of said second stamping tool column;

12 a first stamp slide member attached to a first side of
13 said stamp, said first stamp slide member having portions
14 that form an aperture for slidably receiving said first
15 stamping tool column; and

16 a second stamp slide member attached to a second side
17 of said stamp, said second stamp slide member having
18 portions that form an aperture for slidably receiving said
19 second stamping tool column;

20 wherein said stamp may be slidably disposed on said
21 first stamping tool column and on said second stamping tool
22 column.

1 4. The stamping tool as set forth in Claim 3 wherein
2 said stamping tool is capable of aligning a position of
3 said stamp with respect to a location of said first tooling
4 hole in said integrated circuit substrate to within a
5 tolerance of less than one hundred microns; and

6 wherein said stamping tool is capable of aligning a
7 position of said stamp with respect to a location of said
8 second tooling hole in said integrated circuit substrate to
9 within a tolerance of less than one hundred microns.

1 5. The stamping tool as set forth in Claim 3

2 wherein said lower end of said first stamping tool
3 column is capable of fitting within said first tooling hole
4 in said integrated circuit substrate to within a tolerance
5 of less than one hundred microns; and

6 wherein said lower end of said second stamping tool
7 column is capable of fitting within said second tooling
8 hole in said integrated circuit substrate to within a
9 tolerance of less than one hundred microns.

1 6. The stamping tool as set forth in Claim 5
2 wherein said first stamping tool column is capable of
3 slidably fitting within said first slide member attached to
4 said stamp to within a tolerance of less than one hundred
5 microns; and

6 wherein said second stamping tool column is capable of
7 slidably fitting within said second slide member attached
8 to said stamp to within a tolerance of less than one
9 hundred microns.

1 7. The stamping tool as set forth in Claim 3 further
2 comprising a heating element associated with said stamp.

1 8. The stamping tool as set forth in Claim 1
2 comprising:

3 a stamping tool base comprising a first tooling hole
4 alignment button capable of fitting within a first tooling
5 hole in said integrated circuit substrate and a second
6 tooling hole alignment button capable of fitting within a
7 second tooling hole in said integrated circuit substrate;

8 a first stamping tool column having a lower end
9 attached to said stamping tool base;

10 a second stamping tool column having a lower end
11 attached to said stamping tool base;

12 a stamping tool cross member attached to an upper end
13 of said first stamping tool column and attached to an upper
14 end of said second stamping tool column;

15 a first stamp slide member attached to a first side of
16 said stamp, said first stamp slide member having portions
17 that form an aperture for slidably receiving said first
18 stamping tool column; and

19 a second stamp slide member attached to a second side
20 of said stamp, said second stamp slide member having
21 portions that form an aperture for slidably receiving said
22 second stamping tool column;

23 wherein said stamp may be slidably disposed on said
24 first stamping tool column and on said second stamping tool
25 column.

1 9. The stamping tool as set forth in Claim 8 wherein
2 said stamping tool is capable of aligning a position of
3 said stamp with respect to a location of said first tooling
4 hole in said integrated circuit substrate to within a
5 tolerance of less than one hundred microns; and

6 wherein said stamping tool is capable of aligning a
7 position of said stamp with respect to a location of said
8 second tooling hole in said integrated circuit substrate to
9 within a tolerance of less than one hundred microns.

1 10. The stamping tool as set forth in Claim 8

2 wherein said first tooling hole alignment button is
3 capable of fitting within said first tooling hole in said
4 integrated circuit substrate to within a tolerance of less
5 than one hundred microns; and

6 wherein said second tooling hole alignment button is
7 capable of fitting within said second tooling hole in said
8 integrated circuit substrate to within a tolerance of less
9 than one hundred microns.

1 11. The stamping tool as set forth in Claim 10
2 wherein said first stamping tool column is capable of
3 slidably fitting within said first slide member attached to
4 said stamp to within a tolerance of less than one hundred
5 microns; and

6 wherein said second stamping tool column is capable of
7 slidably fitting within said second slide member attached
8 to said stamp to within a tolerance of less than one
9 hundred microns.

1 12. The stamping tool as set forth in Claim 8 further
2 comprising a heating element associated with said stamp.

1 13. A method for aligning an integrated circuit die
2 on an integrated circuit substrate, the method comprising
3 the steps of:

4 placing a plurality of deposits of deformable material
5 on said integrated circuit substrate where said integrated
6 circuit die is to be attached to said integrated circuit
7 substrate;

8 placing a stamping tool into at least one tooling hole
9 within said integrated circuit substrate;

10 imprinting said plurality of deposits of deformable
11 material with said stamping tool; and

12 placing said integrated circuit die into a pocket
13 formed in said plurality of deposits of deformable
14 material.

1 14. The method as set forth in Claim 13 wherein said
2 stamping tool is capable of imprinting said plurality of
3 deposits of deformable material to within a tolerance of
4 less than one hundred microns with respect to at least one
5 tooling hole in said integrated circuit substrate.

1 15. The method as set forth in Claim 13 wherein said
2 plurality of deposits of deformable material is composed of
3 one of: a metal, a solder material and a polymer material.

1 16. The method as set forth in Claim 14 further
2 comprising the step of heating said deposits of deformable
3 material.

1 17. A method for aligning an integrated circuit die
2 on an integrated circuit substrate of the type comprising a
3 first tooling hole and a second tooling hole, the method
4 comprising the steps of:

5 placing a plurality of deposits of deformable material
6 on said integrated circuit substrate where said integrated
7 circuit die is to be attached to said integrated circuit
8 substrate;

9 placing said integrated circuit substrate on a
10 stamping tool base of a stamping tool;

11 imprinting said plurality of deposits of deformable
12 material with a stamp of said stamping tool;

13 removing said integrated circuit substrate from said
14 stamping tool base of said stamping tool; and

15 placing said integrated circuit die into a pocket
16 formed in said plurality of deposits of deformable material
17 created by imprinting said plurality of deposits of
18 deformable material with said stamp of said stamping tool.

1 18. The method as set forth in Claim 17 wherein said
2 step of placing said integrated circuit substrate on a
3 stamping tool base of a stamping tool comprises the steps
4 of:

5 placing a first tooling hole alignment button of said
6 stamping tool base within said first tooling hole of said
7 integrated circuit substrate to within a tolerance of less
8 than one hundred microns; and

9 placing a second tooling hole alignment button of said
10 stamping tool base within said second tooling hole of said
11 integrated circuit substrate to within a tolerance of less
12 than one hundred microns.

1 19. The method as set forth in Claim 17 wherein said
2 step of imprinting said plurality of deposits of deformable
3 material with a stamp of said stamping tool comprises the
4 steps of:

5 aligning a position of said stamp with respect to a
6 location of said first tooling hole in said integrated
7 circuit substrate to within a tolerance of less than one
8 hundred microns;

9 aligning a position of said stamp with respect to a
10 location of said second tooling hole in said integrated
11 circuit substrate to within a tolerance of less than one
12 hundred microns; and

13 imprinting said plurality of deposits of deformable
14 material with said stamp.

1 20. The method as set forth in Claim 17 wherein said
2 plurality of deposits of deformable material is composed of
3 one of: a metal, a solder material and a polymer material.

1 21. The method as set forth in Claim 17 further
2 comprising the step of heating said deposits of deformable
3 material.

1 22. The method as set forth in Claim 17 further
2 comprising the step of creating at least one geometrical
3 alignment guide feature in at least one deposit of
4 deformable material on said integrated circuit substrate.